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**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Promote Policy and
Program Coordination and Integration in Electric Utility
Resource Planning.

Rulemaking 04-04-003
(Filed April 1, 2004)

**AND
BEFORE THE ENERGY COMMISSION
OF THE STATE OF CALIFORNIA**

Integrated Energy Policy Report Process

CEC Docket No. 04-IEP-01K

**WOMEN'S ENERGY MATTERS
COMMENT ON ELECTRICITY PROCUREMENT, ENERGY EFFICIENCY,
AND NATURAL GAS
DRAFT IEPR CHAPTERS 3, 4 and 7**

October 17, 2005

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COMMENT ON ELECTRICITY PROCUREMENT, ENERGY EFFICIENCY,
AND NATURAL GAS
DRAFT IEPR CHAPTERS 3, 4 and 7**

Women's Energy Matters (WEM) submits these comments as an intervenor in the Integrated Energy Policy Report proceeding at the California Energy Commission and related proceedings at the California Public Utilities Commission.

Introduction

WEM feels the draft report has done a good job identifying some of the recent achievements, continued barriers and challenges to a more functional power system that is responsive to ratepayers' desire for efficiency, affordability, reliability, security, sustainability, and lower pollution.

We offer the following comments on specific sections of the Draft Report, as well as its overall structure. Our comments supplement our oral testimony at the hearings. We also mention our concerns about the September revision of the California Demand Forecast, which we believe should reflect the likelihood of massive conservation in the wake of the recent hurricanes.

Report Structure

The report could be substantially improved by some minor changes in its organization and emphasis, reflecting a more systematic approach to achievement of the "Loading Order" which the Energy Commission, Public Utilities Commission and Governor have adopted as the State's goal. Pursuant to this, chapters and subchapters would be reordered with the two major policy discussions first and then proceeding according to the loading order as follows:

- Electricity Needs and Procurement Policies
- Integrating Water & Energy Strategies
- Conservation, Efficiency and Demand Response
- Renewables
- Distributed Generation and Combined Heat & Power
- Natural Gas, Coal and Nuclear
- Transmission
- Energy Concerns in the California-Mexico Border Region

Climate Change might be more appropriate as an introductory chapter, though in its present form it is probably best as a final chapter.

Transportation Fuels is appropriately presented as a separate section, first (after Climate Change) or at the very end of the report.

WEM believes that putting the chapters and subchapters in this order might lead to some changes in emphasis, clarifying the logic in the report's conclusions and recommendations.

Comments on September 2005 Revised Demand Forecast

A revised *California Energy Demand 2006-2016; Staff Energy Demand Forecast Final Report* was issued in September. While WEM recognizes that there has to be an end point for a massive periodic undertaking like the IEPR, we believe that the staff's demand forecast has been rendered substantially obsolete by the changes in energy supply following Hurricanes Katrina and Rita, and the resulting changes in economics and consumer behavior. It would make the Commission look foolish, and would be a disservice to Californians who depend upon the CEC for guidance at this critical time, to allow the November deadline to prevent a further update that incorporates these changes.

WEM recommends at the very least that the Commission issue a supplement before the end of the year, because, as noted on p. 1-1, CEC's forecasts are utilized by CPUC in its 2006 procurement process for load forecasting, resource assessment, scenario analysis, and resource adequacy, and by ISO in its grid study and transmission planning.

Post-hurricane increases in both gas and electricity prices may equal or exceed the increases of 2001, and may be more prolonged or even permanent. They also come on top of prices that never fully subsided to pre-energy crisis levels.

The Demand Forecast cites rising income levels as a basis for projecting higher per capita energy demand. However, California residents are paying steeply rising costs for housing, in addition to increases in transportation, food and a multitude of other products due to increased oil costs — even before the hurricanes hit. WEM questions whether the report took into account the extent to which these increases are absorbing or even exceeding increased income.

Residential and commercial conservation and energy efficiency efforts are now on everyone's front burner, and renewable energy is more cost effective than ever. Often, these are dismissed because they are not seen as able to cover a rapidly rising demand.¹ Seeing that the demand will be lower could encourage planners to rely more on the alternatives, rather than continue to relentlessly pursue centralized fossil fuel (or nuclear) systems.

Comments on Energy Efficiency (Chapter 3)

Secrecy in Energy Efficiency as well as Energy Supply Contracts

The Report makes a heroic effort to question the secrecy that the CPUC has imposed on the energy procurement process (as well as utilities' refusal to supply data on energy use). The Report should note that the CPUC's new energy efficiency procurement is also enveloped in secrecy, with the same system of utility-selected "Program Review Groups" (PRGs) being the only parties allowed to review utility selection of third party energy efficiency contracts.

The PRGs are only advisory bodies with no enforcement powers, and they also have no power to compel utilities to provide data. Regarding Commissioner Geesman's question why PRG members have allowed themselves to be used as window dressing, WEM believes it is the powerful allure of elite "insider" status as well as guaranteed intervenor funding combined with the hope (or perhaps delusion) that they might have some sort of a helpful impact.

PRG members are supposedly required to be financially disinterested.² However, the fact that they serve at the pleasure of utilities means that as soon as they become (paid) members of the PRGs, they are no longer financially disinterested — they have reason to please the utilities in order to be reappointed to the PRG.

¹ In fact, energy efficiency, renewables and other distributed generation could indeed meet high demand, given comparable investment, however it will take time to counter the *perception* that they are only "small scale" resources, and the problem of investment capital must also be resolved. Community Choice aggregators are considering substantial municipal financing for renewables, however they are being denied access to energy efficiency funds. Investor-owned utilities who control public goods funds have inherent conflicts of interest regarding energy efficiency, renewables and distributed generation.

² WEM is not aware of any process whereby anyone verified that PRG members such as NRDC are not recipients of direct or indirect funding from utilities or other energy-related corporations. NRDC receives some \$70 million a year of grants from foundations such as Rockefeller, PEW and others that are known conduits of energy company money.

Unfortunately, the non-profit “public interest” members of the PRGs not only compromise their integrity, they deprive ratepayers of genuine representation. Since you can count public interest parties in most CPUC proceedings on the fingers of one hand and there are scarcely more than a dozen in the whole state engaged in *any* CPUC energy proceedings at a given time, the utilities are able to knock out a substantial percent of their potential opposition by the simple expedient of appointing them to the PRGs.

Energy Efficiency not yet configured to relieve Peak Demand

WEM has testified at length in these proceedings on what would be necessary to take energy efficiency seriously as a resource. We regret to say these issues are not yet clearly explained in the draft Report.

California has greatly increased funding for energy efficiency programs in 2006-08, however the Report should recognize that programs are not yet ready for “prime time” because the CPUC is only beginning to focus on peak demand reductions. The recent decision approving utilities’ 2006-08 EE portfolios retreated from requiring substantially more air conditioners, a primary contributor to peak.

Note the following statement in a recent CPUC ruling:

Joint Staff has not yet developed the "resource planning" component of the integrated EM&V [Evaluation, Measurement and Verification] cycle to feed the EM&V results into the Commission's procurement planning process and the California Energy Commission's integrated energy policy report. I ask that the utilities consult with their procurement planning staff to augment/refine the integrated EM&V cycle presented in this draft to ensure that updated information from the EM&V studies will feed into these resource planning cycles. (10/4/05 Ruling Soliciting Comment on Draft EM&V Protocols, p. 1, R0108028)

This means that energy efficiency is yet not available as a real “peaking” resource, because it cannot be measured in terms useful to the ISO and LSE resource planners.

WEM Comments on Natural Gas Energy Efficiency (Chapter 7 & 3)

Natural Gas Energy Efficiency still weak

Commissioners received testimony that utilities had increased natural gas energy efficiency in recent weeks at the urging of CPUC. This was limited to low-income

programs that offer assistance such as weatherization, and CARE.³ Utilities will suspend shut-offs during the winter, provide more funds for outreach and advertising for CARE, and ease eligibility requirements.

Unfortunately, low-income energy efficiency programs are notoriously weak. They are not even required to be cost-effective, therefore allowing funds to be wasted on projects that produce little savings. They are extraordinarily time-wasting, requiring the tenant to be available for an average of eight separate visits, from eligibility interviews to audits to installations (by various different crews) and final inspections.⁴

Saving Gas with Solar Water Heaters – see Attachment 1

In response to Commissioner Geesman's remarks at the October 7 hearing, WEM provides an analysis of the opportunity for gas savings with solar water heaters.

Comments on Chapter 3, Electricity Needs and Procurement Policies

WEM recommends that this chapter begin with a discussion of the fact that long-held assumptions about our power system are undergoing major changes. Our society is being forced to acknowledge the *present* facts of climate change and dwindling resources, which urgently require changes in the power system. They are also *creating* economic dislocation, which impacts both the supply and demand of power. The notion of continued, limitless economic and population growth that underlies our current power system is being tempered by these realities. As the limits to growth become more apparent, survival strategies are calling forth a new paradigm of sustainability.

In such a period of transition, it is natural to see dysfunction and discontinuity as old and new paradigms compete. The report describes some of the problems, but mostly neglects to show how they are related and part of a large shift.⁵

³ CARE provides bill-paying assistance for low-income customers. This is much needed, as failure to pay utility bills is grounds for eviction from Section 8 and public housing. However WEM notes that the utility also benefits by paying public goods money to itself and simultaneously getting credit for helping the poor.

⁴ Utilities are also planning to provide more refrigerators in low-income program. WEM has heard anecdotal reports in PG&E territory that some refrigerators promised under the program failed to be delivered.

⁵ Problems mentioned in the report but not adequately discussed in relation to each other include: potential blackouts because of the failure of the deregulated market to produce adequate supplies from merchant generators; unclear plans (and secrecy) of the investor-owned utilities; enormous price spikes in natural gas due to dwindling resources and manipulated data; unproved promises for affordability of LNG; unreliable weather compounding energy supply problems; DWR contracts and RMR keeping ancient power plants on

The Commission could explain the context — the decreasing relevance of old models and the need for alternative, sustainable solutions. *Redirecting our remaining resources towards large-scale efficiency, renewables, and smart, less-polluting distributed power supplies would not only preserve what remains of our affluence, it also represents development opportunities for a more prosperous sustainable society.*

For example, WEM recommends the following specific changes in language:

Original language:

Following a period of flat to slow growth on the heels of the 2000-2001 crisis, California's demand is now growing, fueled by population growth and a rebounding economy. (Draft IEPR p.32)

Change to:

The public's extraordinary conservation response during the energy crisis created a period of flat to slow growth on the heels of the 2000-2001 crisis. Following the energy crisis and the Sept. 11 attacks, Californians got the message from State and national government that conservation was not cool — they were encouraged to increase consumption of all kinds. California's demand has been growing, fueled by higher temperatures caused by climate change, the elimination of Flex-Your-Power conservation messages,⁶ and the utilities' ongoing failure to use energy efficiency programs to address peak load. Less than expected population growth accounts for a smaller-than usual portion of increased demand. In spite of income growth, most Californians are worse off than they were in the 1990s, with less disposable income after enormous increases in housing, energy costs and energy-related increases in most other goods. The catastrophic effects of hurricanes Katrina and Rita on both energy supply and economics are resulting in a national dedication to conservation that may easily surpass the levels of 2001 in California.

life support; the prospect of 9000 MW of cogeneration contracts expiring without being renewed; assorted barriers to all types of distributed generation; the disappointing performance of demand response and the over-complex Renewables Portfolio Standard; the stalemate in transmission construction; the slowness to adopt innovative technologies and computer controls; and a tug-of-war between the need for power at specific locations and other trends moving power production farther away from load. Opportunities for water/energy efficiency remain mostly untapped, and large budgets for energy efficiency programs mostly fail to address peak load. Energy efficiency cannot be considered a genuine alternative by resource planners because of heretofore unreliable measurement and lack of information about where energy efficiency is located. Decisions at all levels are stalled due to confusion over deregulation and reregulation, controversy as to state or federal jurisdiction, disagreements among CEC, CPUC and the Legislature, and — not surprisingly considering the above — a large but indeterminate number of customers who want to leave utilities for community choice, self-generation and direct access.

⁶ The CPUC gave control of the State-developed Flex-Your-Power (FYP) campaign to Edison (for free!) and *forbade* conservation messages — ensuring it would focus on marketing utility rebates for energy-efficient devices.

Dated: October 17, 2005

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CERTIFICATION OF SERVICE

CEC Docket No. 04-IEP-01K

I, Barbara George, certify that on this day August 1, 2005 I caused copies of the attached WOMEN'S ENERGY MATTERS COMMENT ON ELECTRICITY PROCUREMENT, ENERGY EFFICIENCY, AND NATURAL GAS; DRAFT IEPR CHAPTERS 3, 4 and 7 to be served on all parties by emailing a copy to the CEC Docket Office and sending one hard copy by mail.

Dated: October 17, 2005 at San Francisco, California.

Declarant

THE TIME IS RIGHT NOW FOR SOLAR WATER HEATERS

At the October 7, 2005 hearing on natural gas issues, WEM proposed that the Energy Commission champion solar water heaters, which are very effective gas-savers.¹ (Water heating is the largest energy user in the home next to space heating/cooling.)

Commissioner Geesman questioned whether the well-publicized problems with solar water heaters in the 1980s had ever been analyzed. Indeed, there is extensive analysis in the book, *Who Owns the Sun*, by Dan Berman and John O'Connor (Chelsea Green, 1996) which is available online at <http://www.chelseagreen.com/1996/items/576/Excerpt> It also offers some very practical solutions:

Guaranteeing reliable solar hot water systems should be no more difficult than assuring trouble-free plumbing and electricity. Solar water heaters should be required by building code, as in Israel, and natural gas, propane, and electricity should be used merely as backups. Anxieties about reliability could be met with rigorous supervision of contractors' qualifications, reasonable performance guarantees, and repair facilities, just as they are with any other home technology. Rather than using the failures of the fast-buck artists to destroy the reputation of solar water heating, the political challenge should be to design systems of manufacturer warranties, contractor licensing, building inspection, regular maintenance, and citizen education—all of which strengthen the reliability of solar hot water heating as a technological system. Compared to the failures of nuclear power, the technical problems of solar water heating and wind power have been miniscule. (*Who Owns the Sun*, p. 32)

WEM notes that the recently passed federal energy bill contains tax credits of 30% (up to \$2000), for any form of solar installed before Dec. 2007.² This may well spur another generation of “fast buck artists” in solar water heating (especially considering the higher relative cost and temporary shortage of photovoltaics). The CEC should ensure the kinds of controls described above to protect California consumers. It would be well worth the trouble:

Many of the well-publicized stories about quality-control problems caused by “tax-shelter developers” and fly-by-night solar hot water contractors were true.

¹ WEM notes that solar thermal technology can provide space heating as well as all residential and commercial water heating applications, including pool heaters.

² For details on solar thermal in the 2005 legislation see <http://www.fsec.ucf.edu/EPAct-05.htm#solar>

But good solar hot water systems installed by reputable organizations such as the Solar Center are still functioning [ten years later]. The property manager at the St. Francis Square Apartments—a cooperative 299-unit complex ... completely equipped with solar water heaters by the Solar Center—reports that despite a four-and-a half-day gas failure during a cloudy week in May 1991, the Solar Center system by itself was able to keep shower temperatures at a comfortable 105°F. In nearly fifteen years the system has functioned perfectly, he said, with only routine, twice-yearly maintenance to clean the solar panels, repair those broken by vandals, and check the electronic components. (Ibid, p. 31)

Current SMUD and Arizona financial assistance for solar water heaters

Sacramento Municipal Utility District (SMUD) currently offers 100% loan financing (10 yrs. term) for solar water heaters that meet SMUD standards and are installed by SMUD approved contractors (plus an additional \$400 rebate for those converting from electric water heaters). It also provides free maintenance inspections at 5 and 10 years.

The State of Arizona currently offers tax credits on 25% of the purchase price, up to \$1000, for solar water heaters. The Arizona Solar Center advises:

Most solar water heaters will recoup their initial investments during the first ten years of operation, some within the first few years. However, no other appliance is judged on its payback period, and for that reason we recommend homeowners consider a solar water heater as an investment, and view the savings as a return on investment. (<http://www.azsolarcenter.com/benefits/solarwatersavings.html>)

California's investor-owned utilities continue to resist solar water heaters

Lawrence Berkeley National Lab (LBNL)'s solar water heater page tells readers to go to their local utility for solar water heaters - to be on the safe side.

“One of the best ways to get a solar system installed is through a utility program. Vendors and service people who are selling many units in cooperation with a utility program are likely to survive long enough to repair your system if it ever gives you trouble.” Xxx website

Unfortunately California's investor-owned utilities are not offering solar water heater programs.

LBNL's article (from its Home Energy magazine) mentions “Using the sun to heat water can be cost-effective and environmentally friendly,” but doesn't bother to spell out HOW cost-effective and friendly – instead it highlights warnings and precautions. Rather than provide detail on solar water heater systems, it puts forth a lame proposal to bring water up to room temperature before using the electric/gas heater.

LBNL is in charge of the water heater “PAGette” (mini-program advisory group) set up by utilities for their 2006-08 programs. WEM was informed that solar water heaters will not be on the PAGette’s agenda.

Is there really a history of problems with solar water heaters?

The Solar Center (described in the first quote above) still exists. Its website offers a delightful illustrated history of the technology by solar historian John Perlin. The first commercial version, the Climax, was patented in 1891 and sold with a unique marketing slant:

Kemp originally marketed his invention to eastern gentlemen whose wives had gone off with their maids to summer at some resort, leaving their husbands to fend for themselves. The solar water heater, Kemp advertised, would simplify housekeeping duties for this class of men already burdened by their wives and domestic staffs absence and unaccustomed to such work as lighting the gas furnace or stove to heat water. xxxwebsite

Sixteen hundred were installed in California by 1900. An improved version, the “Day and Night Solar Water Heater” took over the market in 1909 and sold 4000 by 1918, but then “The huge discoveries of natural gas in the Los Angeles basin during the 1920s and 1930s killed the local solar water heater industry.”

In Florida, however, the industry flourished: by 1941, more than half the population heated their water with the sun. Then:

Declining electric rates after World War II, in tandem with an aggressive campaign by Florida Power and Light to increase electrical consumption by offering electric water heaters at bargain prices, brought Florida's once flourishing solar water heater industry to a screeching halt.

The site mentions 4 million solar water heaters operating in Japan by 1969, when their industry collapsed due to the advent of large oil tankers. It revived shortly after the '73 crisis, and 10 million were in use as of Perlin’s writing.

In Israel, 90% of households have solar water heaters today. Economies of scale have brought the price way down (current average installed price in California is \$2500):

According to Arthur Shavit, a professor of mechanical engineering at the Technion, Israel’s foremost technical university, four simple conditions must be met for solar water heating to become reestablished: 1. Solar water heating must be cheaper than the alternatives; 2. People must know about this option; 3. Government building codes must require use of solar; and 4. The equipment must be readily available. In Israel, all four conditions have been met. Israeli building

codes now require solar water heating in all new buildings. As a result, Israelis install 50,000 new heaters a year at a cost of under \$1,000 apiece. (*Who Owns the Sun*, p. 14-15)

Such widespread success confirms that the California disaster stories of the 1980s were driven more by politics than any inherent flaws in the technology:

Republican George Deukmejian won the California governor's race in 1982 on a platform that explicitly included the elimination of solar and energy conservation tax credits, and he quickly fulfilled the promise. Despite their conceptual and operational simplicity, solar technologies such as domestic solar water heating were vehemently characterized as unreliable, futuristic, and frivolous, setting the political stage for removal of the tax credits and sabotage of the budding solar industry... Rather than initiating serious programs to monitor and train solar hot water installers and drive the rip-off artists out of business, the opponents of solar water heating exploited the apparent abuses to abolish both federal and state tax credits, which killed the programs. Other solar initiatives of the early 1980s—such as the savings and loan association that financed \$500,000 of the Solar Center hot water projects at low interest rates in its first year—were never institutionalized, and the proposed federal Solar Bank and mass federal and state government purchases of photovoltaics were never enacted... Today, the best-funded environmental groups, including the Natural Resources Defense Council, have deferred to utility claims that even solar hot water production is not “cost-effective,” and such deference has been tolerated because it is not yet common knowledge among environmentalists that most people in Israel, Cyprus, Japan, Colombia, and Jordan already get their hot water from solar heaters... The California Solar Energy Industry Association reports that Southern California Gas fought the South Coast Air Quality Management District for the right to continue to heat swimming pools with gas and “strongly opposed” a 1991 bill that would mandate solar hot water heating in high-pollution areas like Los Angeles. (*Who Owns the Sun*, p. 37-38)

Is solar cost-effective for replacing gas as well as electric heaters?

An article by Andy Walker of the National Renewable Energy Lab reports that solar water heaters are cost-effective when gas is above \$10 MMBtus. It is currently around \$13-14. The article expresses the advantages of the technology:

Nationwide, approximately 18% of energy use in residential buildings and 4% in commercial buildings is for water heating. Solar water heating systems, which uses the sun's energy rather than electricity or gas to heat water, can efficiently provide up to 80% of the hot water needs—without fuel cost or pollution and with minimal operation and maintenance expense. NREL Whole Building Design Group <http://www.wbdg.org/design/swheating.php> [Emphasis added]

The site offers drawings and photos of various types of collectors for different climates and end-uses, lists "Manufacturers of Collectors and Distributors of Systems Certified by the Solar Rating and Certification Corporation" and links to applicable standards.

We were unable to find a calculator for cost-effectiveness of solar replacing gas water heaters, however three reputable websites offer data on replacing electric with solar, which could be modified.

Rocky Mtn. Institute (Amory Lovins) website has a chart comparing various water heater options (based on electricity costs of \$0.083/kWh and natural gas costs of \$0.92/therm):

Table 1: The economics of replacing an electric water heater								
Type of water heater	Avg. installed cost (\$)	*Annual savings (\$/yr)	Percent savings	Payback (yr)	Installed cost with drain-water recovery system (\$)	Annual savings (\$/yr)	Percent savings	Payback (yr)
BASILINE: standard electric tank	250	—	—	—	550	117	—	2.6
high efficiency electric tank	600	39	10	9.0	900	144	37	4.5
standard gas tank	300	142	36	0.4	600	216	55	1.6
high efficiency gas tank	600	167	43	2.1	900	234	60	2.8
demand gas tank	650	179	46	2.2	950	242	62	2.9
point-of-use gas tank	1,935	216	55	7.8	2,235	268	69	7.4
solar	2,500	303	78	7.4	2,800	329	84	7.7
air-source heat pump	1,250	229	59	4.4	1,550	277	71	4.7
geothermal heat pump	2,500	291	75	7.7	2,800	321	82	8.0
* Savings calculations based on electricity costs of \$0.083/kWh and natural gas costs of \$0.92/therm								
Source: RMI analysis								

The Arizona Solar Center website offers a sophisticated Excel tool for Solar Life Cycle Costing Analysis. For a solar heater worth \$3800 rolled into mortgage rates, it shows a 15-19% return on investment over 10-30 years.

The Federal Energy Management Program has an interactive tool for calculating the cost of using base, better and best gas water heaters, which allows users to view assumptions such as length of showers, etc. —

http://www.eere.energy.gov/femp/technologies/eeep_waterheaters_calc.cfm — WEM's rough calculation assumes \$1.00/therm (\$10.00 /MMBtu), average use (three ten minute showers with a low-flow 2.0 gals/min shower head, dishwashing and a load of wash daily). The mid-range gas heater requires \$241/yr. If the solar water heater installed costs \$2500 (reduced to \$1850 with the federal tax credits), and replaces 80% of the \$241

(\$193), it would be paid off in a little over ten years (including average maintenance costs). After that it would provide virtually free hot water for another ten or more years.³

From a societal point of view solar water heaters are even more attractive. Installing solar waters on ten of California's eleven million households over the next ten years would surely bring the cost down, provide thousands of decent jobs and business opportunities, and eliminate approximately 1/10 of the State's total demand for natural gas⁴ — along with a major source of indoor air pollution and greenhouse gases.

Conclusion

It is unconscionable that sunny California, in 2005, should lag behind the Bush administration in a crucial gas and electricity-saving measure. WEM urges Energy Commissioners to break free of past doubts, recognize the horror stories as industry propaganda, and assist consumers to address our 21st century problems with this trusty 19th century technology.

Dated: October 17, 2005

Respectfully Submitted,

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³ A friend of mine bought a house built in the 1950s by a PG&E executive. Its solar water heater — which he hand-built when the house was new — is still working fine.

⁴ According to Federal Energy Management Program, the average gas water heater consumes 241 therms/yr. Divide by 365 days = .66 therms/day, or 66 cu. ft. (1 therm = approx. 100 cubic feet.) According to the CEC Natural Gas Report, California's total natural gas demand (all uses) is 6200 million cu. ft./day. 10 million households x 66 cu. ft. = 660 million cu. ft.